

MARINE REVIEW.

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The Pioneer Fast Cruiser Esmeralda.

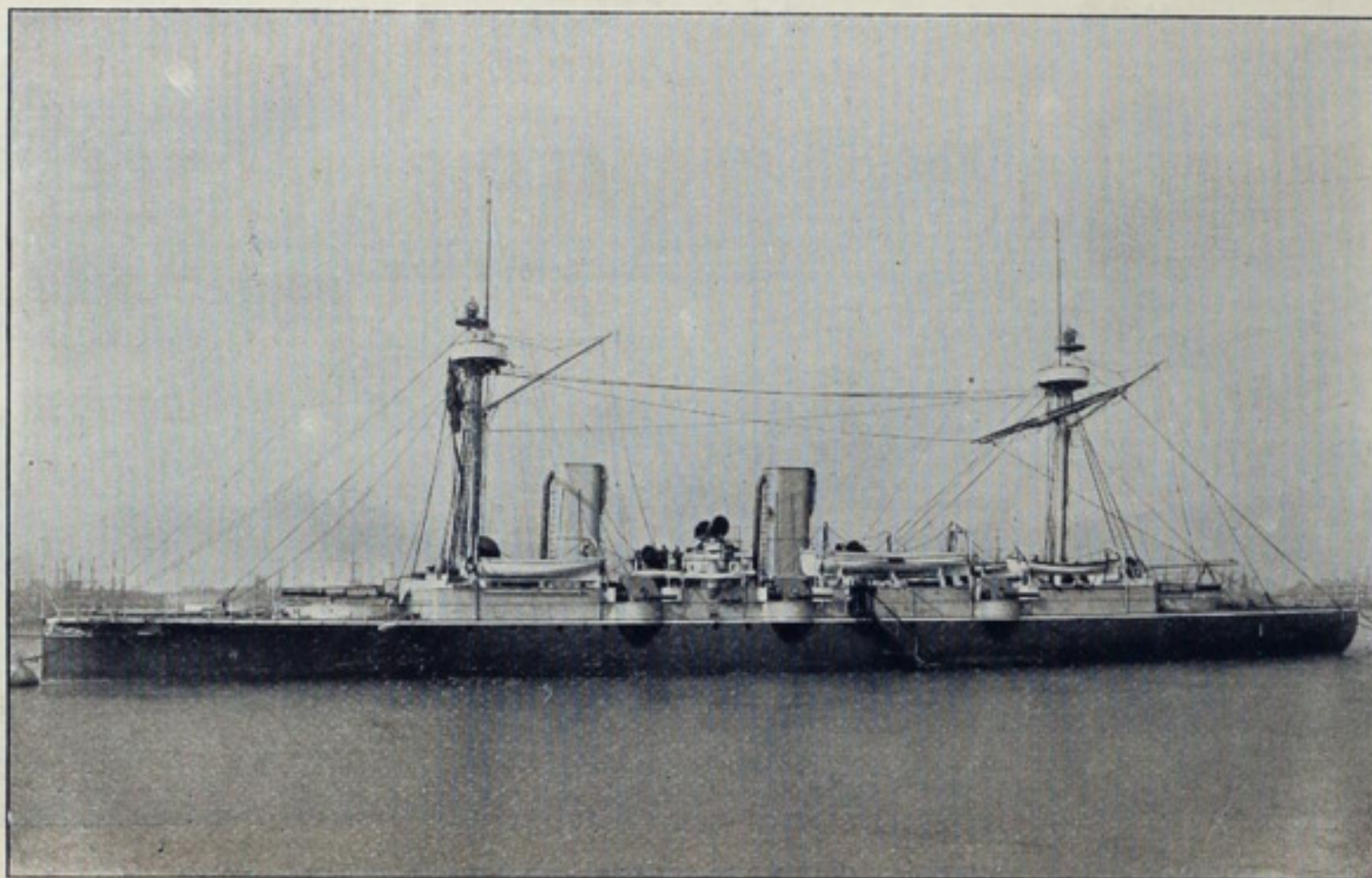
In these days of 23-knot cruisers, it is interesting to look back at the introduction of this important class of warship. The Esmeralda, built for the Chilian government by Chas. Mitchell & Co., now Armstrong, Mitchell & Co., on the Tyne, came out in 1883-4, and created almost as much of a sensation as the Minneapolis did recently. There are few war vessels that have been in as many entanglements as the Esmeralda. It will be remembered that the prospects were bright, not long since, for her engaging the United States navy single-handed.

Her length is 270 feet, beam 45 feet, hold $18\frac{1}{2}$ feet and displacement 3,000 tons. Her speed of 18.28 knots, which she has exceeded by a quarter of a knot, is all the more remarkable when it is considered that she has compound engines instead of triple expansion. The cylinders are 43 and 82 inches by 36 inches stroke, and her twin screws make $116\frac{1}{2}$ revolutions at the speed mentioned. The propellers are $14\frac{1}{2}$ feet by 18 feet pitch, and the indicated horse power is 6,750. Her boilers have a combined grate surface of 450 square feet, and the heating surface is 15,256 square feet. The illustration is from a photograph loaned to the REVIEW by a Cleveland naval architect who was employed in the New-castle yard while the Esmeralda was being constructed.

from the head of the lakes being sufficient to care for all surplus tonnage offered on the market on account of the suspension of shipments from Escanaba and Marquette.

Among the Ship Builders.

Several steel vessels building in lake ship yards are now about ready for launching. On Saturday, the 27th inst, the Globe Iron Works Co., Cleveland, will launch the steel tow barge Tyrone, building for Messrs. Irwin, Tener and others, owners of the steamers Harper and Nimick. This boat, alike to the tow barges built for the Minnesota company and John Corrigan at Chicago, will be fitted with a steam towing machine. On the same date, Wheeler & Co. of West Bay City will launch one of the big Eddy-Shaw steamers, the first of seven steel freighters which they have under contract. On the following Saturday, Aug. 3, Mr. R. R. Rhodes' steamer Yale, another of the largest type of ore carriers, will be launched by the Cleveland Ship Building Co. It is expected also that the 400-foot steamer Zenith City, being built at South Chicago for A. B. Wolvin of Duluth, and others, will be ready for launching during the first week in August. The launch of the Zenith City will leave the Chicago yard with no contracts other than that covering the steel tow barge for John Corri-



CHILIAN CRUISER ESMERALDA—ONE OF THE FIRST FAST BOATS OF HER CLASS.

Lake Freight Matters.

Cleveland companies controlling the iron ore mines on the Menominee and Marquette ranges where miners have quit work will have submitted to the men, by Saturday or Monday next, a proposition involving a material advance in wages. The advance will not be anything like the 30 or 35 per cent. increase demanded by the men in some of the mines, but it is thought to be sufficient to hope for a renewal of operations next week at the idle mines. It is unfortunate that the miners who quit work did not give notice of their intention to ask for increased wages, and allow mining operations to continue, as was done in the case of the Chapin mine, while the wage schedule was being adjusted. There is, of course, no certainty of the present difficulties being settled on the propositions made by the mine owners; neither is there any assurance of miners on other ranges continuing work at present wages, and thus the iron mining situation is so uncertain as to leave the question of lake freights very much in doubt.

Then, too, there are indications of a strike of all miners of soft coal in Ohio and Pennsylvania on Aug. 1, so that another drawback from labor difficulties is liable to reduce shipments of coal at a time when up-bound cargoes would tend to greatly improve the freight situation. It is evident, however, that both ore and coal producers will do all in their power to keep mines in operation, and will pay such advances to labor as may be permitted by their sales. The rate from the head of Lake Superior would very probably be 95 cents today if it were not for the strike of ore miners. As it is there has been no change in rates, the movement of ore

gan and others of Cleveland. The Globe Company, Cleveland, has a revenue cutter to build for the government and has just laid the keel for the largest of all ore carriers—412 feet keel—which is to be managed in the office of M. A. Hanna & Co. At the yard of the Cleveland Ship Building Co. the launch of the Yale will be followed by active work on the new 400-foot steamer for the Wilson Transit Co. This boat is to be 45 feet beam, although most other boats of 400 feet length are given 48 feet width. Capt. Wilson says there are some places where steamers of 48 feet beam can not well be handled, and he is desirous of having his boat suited to all harbors. Notwithstanding his decision in this regard, he is of the opinion, however, that boats of 50 feet beam will be built later, but that the limit of length for some time to come has been reached.

Capt. J. H. Andrews, who built and sailed the schooner Nellie Redington, and who is probably as well known as any vessel captain that ever sailed the lakes, is now living in Florida. Capt. Andrews quit sailing only a year or two ago, and it is said of him that during a period of full fifty years in the lake service insurance companies were compelled to pay only \$2,600 on his account. He was among the few men now living who were connected with trading business on Lake Superior before a canal of any kind was built at Sault Ste. Marie.

Lumber rates from the head of Lake Superior are still quoted at twelve shillings to Ohio ports, thirteen to Buffalo and Tonawanda and fourteen to Chicago.

Double Swing Bridge.

A NOVEL STRUCTURE WHICH DOES AWAY WITH A CENTER PIER AND OVERCOMES OTHER UNSATISFACTORY CONDITIONS THAT ARE COMMON TO LAKE PORTS.

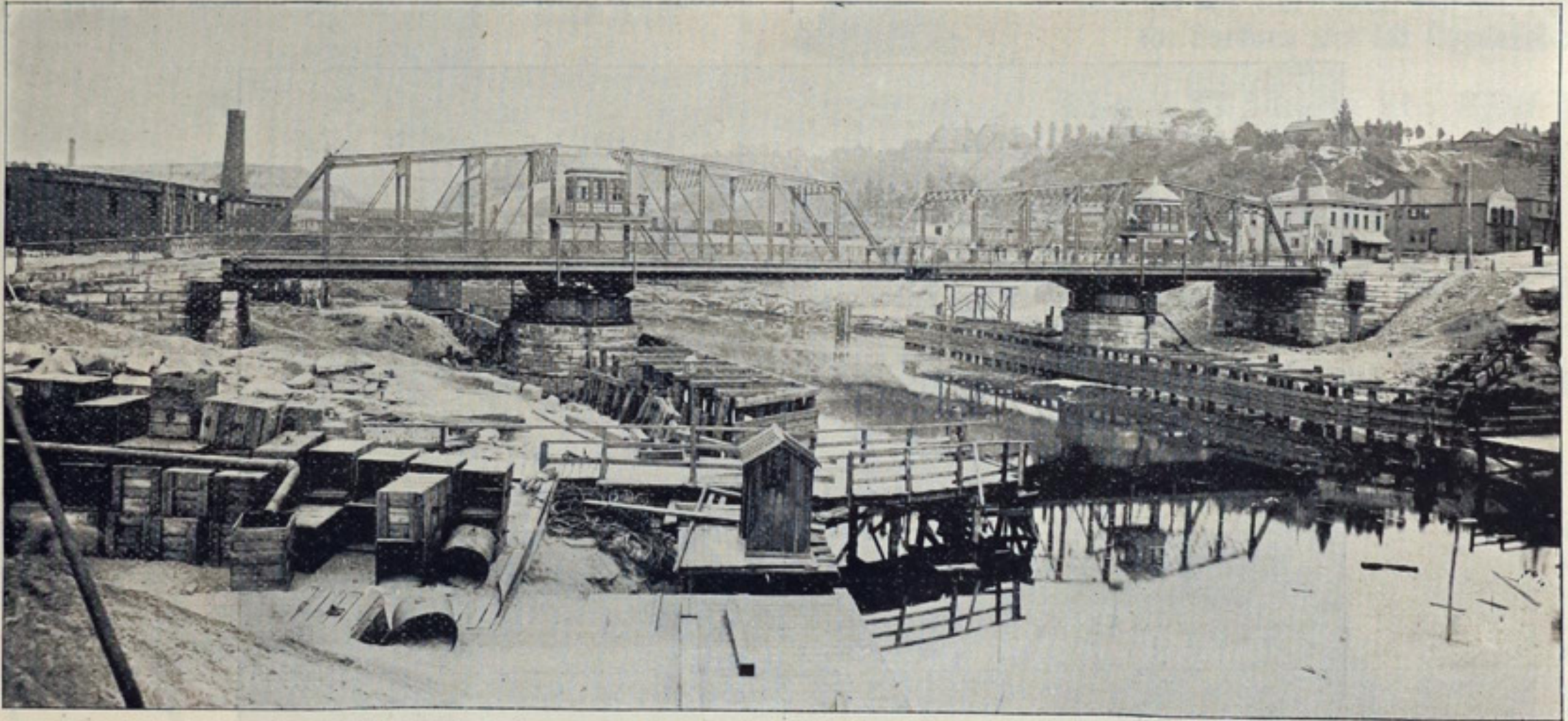
Quite a novel structure has been erected over the Cuyahoga river at Columbus street, Cleveland. It has now been in successful operation for three weeks, and it is the outgrowth of peculiar conditions. It is located in a very bad bend of the river, and the old structure which it replaces was a serious menace to safe navigation. The conditions to be met and overcome were first the abolition of a center pier; second, the eradication of very heavy grades at the two approaches of the old structure; and as a third requirement it was necessary to satisfy the demands of a railway, so as to permit them to construct three tracks, if necessary, along the dock line, thus rendering accessible valuable dock property which has long been useless.

The structure is a double swing bridge with a total length of 279 feet and a clear opening of 113 feet between pile protections, each span being 139½ feet in length with a long arm of 75½ feet and a short arm counter-weighted of 64 feet. The height of trusses, center to center of chords at center of each span, is 26 feet and at ends of each span 21 feet. The bridge is on a grade of 3 per cent. and the grade line is 27 feet above the river at the center of the opening. The clear roadway is 20 feet between wheel guards and there are two side walks 6 feet in the clear each, the trusses being 23 feet between centers. The two bridges are revolved by electric motors, and all auxilliary movements are made by compressed air. The time of swinging varies from 28 to 30 seconds.

by the piston of a compressed air cylinder located in the bottom chord. This toggle fits into sliding bearing plates slightly cupped and located above and below the chord, forming part of the upper portion of the anchorage.

The ends of the spans are convex at the center of the structure, the circle beams approaching to within 4½ inches on the center line of the roadway. On account of the rapid departure of the curves in the vicinity of the side walks, the space is bridged by means of an apron 5 feet 4 inches in length, extending the full width of the bridge, with independent sections of hand rail. When the apron is raised, this allows unobstructed movement of the two bridges up and down the stream or in contrary directions. The apron, as far as the roadway is concerned, rests on the floor joists and has a comparatively slight space to bridge across. It is counter-weighted and revolved through an arc of about 50 degrees, a rack being attached to the counter-weight and operated by a pinion on the cross shaft. It is revolved by the motion of two steel plungers of 5½ inches diameter with tapered ends attached directly to the pistons of two compressed air cylinders 11½ inches in diameter and 19½ inches stroke. The plungers move with the apron and are intended only to transfer shearing stress and preserve an even joint. They are located 3 feet 4 inches on each side of the center line of the bridge, and the strain transmitted by them is conveyed to the trusses through the floor and circle beams and stringers. The plungers have ¼ inch clearance in the receiving box.

The electrical plant consists of two Westinghouse, waterproof, multi-polar, railway type, single reduction motors of 25 horse power each, with



DOUBLE SWING BRIDGE AT COLUMBUS STREET, CLEVELAND—SPANS CLOSED.

The trusses were calculated for a live load of 100 pounds per square foot of roadway and 80 pounds per square foot of side walk, or 3,000 pounds per lineal foot of bridge. The roadway was figured for a concentrated load of 16 tons on four wheels. The total cost of the structure is about \$96,500, including cost of real estate.

The turn table is rim bearing revolving in a horizontal plane, the grade of the bridge being secured by difference in the height of the bearings under the loading beams. The drum is 23 feet in diameter and 39 inches high. The bridge is supported by two loading beams on spherical bearings on cross girders, the load being distributed over eight points on the drum. All pinions, racks and wheels are of cast steel. The tracks are rolled steel and were leveled with a mixture of seven parts of sulphur to one part of coal tar, melted and poured under the track after the same had been brought to perfect level. The tracks are connected with center pin by riveted struts. In finishing the tracks they were bolted to the drum and planed by revolving the latter on a large lathe.

The superstructure is constructed of soft and medium steel, the chord and post sections being made up of 10-inch channels. All material was oiled at mills and given two coats of red lead after erection. The operating houses are located over the side walk.

The anchorage at the foot of each batter-post of shore ends consists of a steel box and bracket beams connected by four rods of two inches diameter to a steel platform 5½ feet by 11 feet, embedded in the masonry near the ground line and composed of 10-inch and 12-inch I beams. The anchorages are fully accessible at all times and any one or two of the rods can be removed for painting or replacing at any time, on account of excess of metal over requirements. The connection of the bridge with the anchorage is made by means of a toggle driven slightly past its center

the necessary controllers, switches, cutouts, etc., and an auxiliary motor of 5 horse power for running the air compressor. The current is brought to the bridge from two power houses, so as to have two independent sources of supply in case of failure of power, and is carried by means of armored submarine cables between the center piers of the two spans in a dredged trench 6 inches below the bed of the river. An emergency cable, and a lead pipe for the transmission of compressed air, telephone wire, etc., is also laid in the same trench. Compressed air tanks or receivers of 25 cubic feet capacity each are located under the roadway of each bridge. Four safety gates are used, two at each end of the structure, the operators having independent control of each gate. They are of the Bogue & Mills type and are operated by compressed air. Powerful band brakes are placed on each bridge and operated by a foot plate. Electric wires and cables were brought from the bottom of the river part way up the center piers and through a duct emerging from the center pin, where connections were made. The controllers are the special design of G. P. Nichols & Bro. All movements of the structure can be made by hand power if necessity for this should ever arise. Following are some figures regarding material in the structure:

Total weight of structure, net tons.....	427½
“ cubic yards of masonry.....	2,308
“ cubic yards of concrete.....	447
“ lineal feet of foundation piles.....	12,223
“ cubic yards of excavation.....	4,800
“ “ dredging.....	2,060
“ timber in foundations, oak, feet, B. M.....	127,492
“ “ pine, “	96,452

Total protection timber, temporary, feet B. M.....	34,536
" " piles, temporary, feet, lineal.....	3,353
" " " permanent, "	7,306
" " timber, permanent, feet, B. M.....	22,802
" bolts and clamps, pounds.....	46,710

Costs of the structure are represented by the following figures:

Substructure, including sewer outlet.....	\$16,000
Superstructure.....	27,000
Electrical and compressed air equipment.....	5,000
Operating houses.....	592
Wires to bridge.....	500
Real estate.....	14,686
Paving approaches.....	2,000
Sewers.....	695

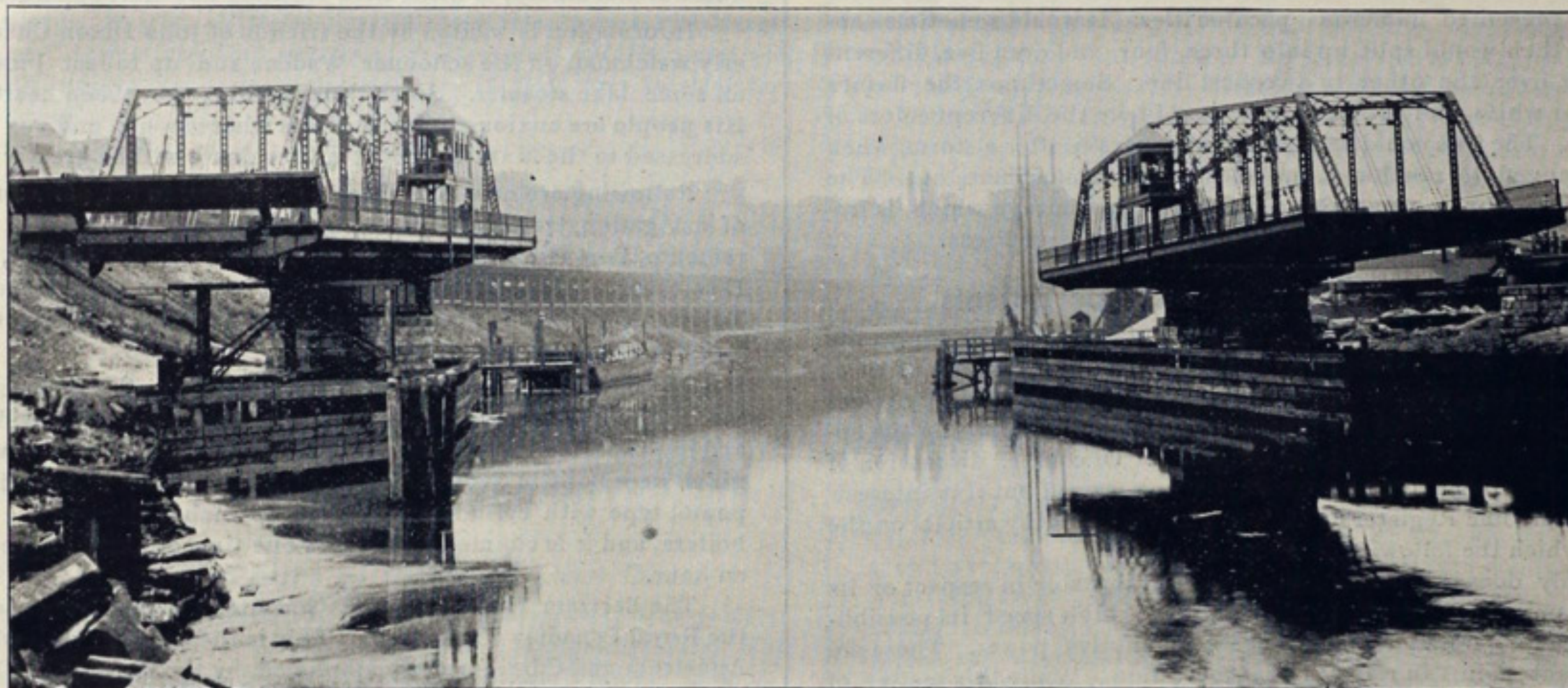
The four foundations are all piled, the piles being driven 2½ feet to 3 feet between centers and with an average penetration of about 27 feet. The grillage platforms of the center piers consist of nine and eight courses respectively of solid timber, drift bolted and alternating in the proportion of two courses of oak to one of pine. These grillage platforms have side walls carried up and caulked, thus forming a caisson in which masonry was laid, the same being sunk on top of the piles, which were cut off 16 feet under water. At the south abutment the conditions of a sliding bank with a 10 per cent. slope, and the proximity of railroad tracks with the constant jarring attendant upon the same, necessitated heavy masonry and thorough drainage. Berea sandstone was used in all

rods were measured for each particular engine, this did not interrupt the work of construction. Today almost every part of an engine or other machine could be made in different shops, widely separated, and then assembled into a complete machine without a hitch. This would have been impossible under the old plan. Taking all the disadvantages into consideration, the wonder is that the mechanics of fifty years ago could turn out as good machines as they did.—Robert Allison in Cassier's Magazine for August.

Co-Operation with the Hydrographic Office.

When it is said that the object of the hydrographic service on the great lakes is the collection and dissemination of marine news, very few people understand what it really embraces. Visitors to the office see a large portion of the space in the office taken up by the apparatus for the reception of time, and the dropping of the time ball. Another large portion is occupied by the chart and publication cases. To the casual observer, then, it would seem that the office was for the dissemination of time, and the publication of charts. Before marine news can be distributed it must be collected, and the more facts of value to the marine world collected, the more valuable the office becomes. The hydrographic office, then, is a co-operative service; and in order that it may be of benefit to the mariners on the great lakes, it is necessary that the mariners co-operate with it, by each one giving it any information which would be of interest to people in the same portion of the lakes as themselves.

It is also earnestly desired by the hydrographic office that any errors or omissions in any of its charts or publications be reported, so that cor-



DOUBLE SWING BRIDGE AT COLUMBUS STREET, CLEVELAND—SPANS OPEN, GIVING FULL CHANNEL WIDTH TO VESSELS.

of this work. The work of tearing down the old bridge was commenced Aug. 15, 1894, and the new bridge was opened to traffic June 25, 1895.

The work was executed by the following contractors: Substructure, Fisher & Fisher, Cleveland; superstructure, W. H. Pratt, receiver of Mt. Vernon Bridge Co., Mt. Vernon, O.; electrical and compressed air equipment, G. P. Nichols & Bro., Chicago, Ill. Special mention is accorded Mr. John Brunner of the staff of the Mt. Vernon Bridge Co., who largely co-operated in making the structure a success; also Mr. Wm. M. Hughes of Chicago for valuable consultations. The structure was designed under the immediate personal supervision of Walter P. Rice, chief engineer, and James T. Pardee, city bridge engineer of Cleveland, who was placed in charge of the work.

Building a Steam Engine Fifty Years Ago.

First a large drawing board was prepared, large enough to make a plan and side elevation, full size. Engines all being of very long stroke, the drawing boards were quite large, an engine of 14 inches diameter and 48 inches stroke, taking a board about 6 by 20 feet. The engine was plotted down, lines chalked and leaded; patterns were then made to correspond to the drawings, castings were made and fitted, but connecting rod, piston rod, valve rods, etc., were left till the cylinder guides and pillow-block were fitted on the bed plate. Measurements were then taken for the different rods, and the rods made the proper length to fit. No two engines were exactly alike; variations in shrinkage and fittings were adjusted in the length of the rods. Generally after the first engine was made, the drawings were planed out, so that the drawing board could be used for another size. This destroyed the record of sizes, but as all

rections may be made. The observation forms which have been sent out to a number of the masters on the lakes are valuable when filled out, and the deductions from the data thus assembled become more valuable as the number of the observers increases.

All communications addressed to either of the branch offices, Chicago and Cleveland, or to the main office in Washington, will receive prompt attention, but it must be remembered that a personal visit is much preferable to a letter.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on July 20, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago	16,457,000	2,292,000
Duluth	6,573,000	
Milwaukee.....	240,000	
Detroit.....	243,000	112,000
Toledo	488,000	153,000
Buffalo	1,175,000	289,000
Total.....	25,176,000	2,846,000

As compared with a week ago, the above figures show at the several points named a decrease of 851,000 bushels of wheat and 161,000 bushels of corn.

A dividend of \$1.75 a share was recently declared on stock of the Chandler Mining Co., Vermillion range.

Seeing Sixty Miles.

The lake survey parties under Assistant United States Engineers Haskell and Russell have recently measured some angles of the triangulation, which involved seeing across Lake Superior from Gargantua to Crisp's point, a distance of over sixty miles. At Gargantua the old station to which connection had to be made was about 410 feet, and at Crisp's point the station was about 280 feet above the lake. On account of the curvature of the earth, a straight line connecting the two points would pass under the water for a considerable part of its length. At Crisp's point an observing station 100 feet high was built and a straight line from the top of it to Gargantua would still pass under the water in the middle of the lake. Atmospheric refraction, however, causes a bending of lines of sight so that distant objects are apparently lifted up—but even with the average refraction conditions it would have been impossible to see one of these stations from the other. If this line could not be seen across, however, it would be necessary to occupy three additional stations in the Canadian wilderness east of Lake Superior, and the cost of the work would have been almost prohibitory. But it was known that the refraction sometimes becomes excessive, especially on Lake Superior, and both stations were occupied with the hope that these extraordinary conditions would occur and permit the line between the two stations to be seen across. Accordingly, Mr. Haskell's party occupied the station at Gargantua, and Mr. Russell's party occupied that at Crisp's point.

For two weeks the necessary conditions were patiently waited for, but finally the smoke cleared away, and the sun came out so that the mirrors at each station that had to be used to flash light from one to the other, could be brought into play. The sun flash was finally seen and the angles were soon measured. The sun flash as seen from one station to the other presented numerous peculiarities. It would sometimes appear single, then would split up into three, four, and even five, different flashes—one over the other in a vertical line. Sometimes the flashes would appear white, and at others they would take the different colors of the rainbow. The line could be seen across generally after a storm, when the wind changed to northwest and cleared the atmosphere out. The conditions were the same as those attending the mirage which is frequently seen, especially on Lake Superior.—Detroit Free Press.

Electricity as a Motive Power for Vessels.

Reports of progress made in recent trials of an electric motor on the Baltimore & Ohio railroad seem to indicate that the adoption of electricity as a motive power on the railroads of this country generally is not far off, and as a result there is a renewal of speculation regarding the application of electric power to sea-going ships. Of course, discussion of this kind has reference to a future that is a long way off but it is interesting. The Maritime Register of New York has a lengthy article on the subject, of which the following is a summary:

"Not only does this power seem almost illimitable in respect of its ability to draw great loads, but in the matter of high speed its possibilities are without parallel in any other known motive power. These are very important points in railroad transportation. While this matter of electrical power as applied to our railroads is undergoing solution, the outcome of which is likely to develop some very great surprises, would it not be possible to apply the power as well to ocean vessels? In the vessel this power would have to be carried in storage batteries, were it practicable, or generated on board of the vessel itself. It may be argued that it would be necessary to use steam in order to generate the electricity and that the combining of the two might materially increase the expense of running the vessel. The experiment has yet to be tried to determine its cost. If, however, a greatly higher rate of speed should be developed in consequence, even at a slightly increased cost, its adoption in fast ocean vessels would not be long delayed. Something must yet come to the vessel out of all this agitation about electricity as a motive power. There is hardly a doubt as to what is yet in store for the railroad from it. It remains to be seen what there is in it for the vessel; whether it means higher speed simply, or whether it is to become in time the principal and perhaps the exclusive motive power of all ships that sail the seas. Instead of the question, 'Is steam destined to supercede sail entirely,' it would not be surprising to hear it asked, 'Is electricity to become in the future the only and exclusive motive power for all vessels?' It must be acknowledged that up to the present time there has been very little developed from it of direct value to the ship in this respect. Indirectly as a propelling force it is most important, and in a modified form and one easily adaptable it must eventually reach the vessel, perhaps at no very distant day."

THREE BOOKS OF SAILING DIRECTIONS, ONE COVERING LAKE SUPERIOR AND THE ST. MARY'S RIVER, ANOTHER COVERING LAKE MICHIGAN AND THE STRAITS OF MACKINAC, AND A THIRD TAKING IN LAKES HURON AND ST. CLAIR WITH DETROIT AND ST. CLAIR RIVERS, ARE NOW OFFERED FOR SALE BY THE HYDROGRAPHIC OFFICE. THESE BOOKS ARE PARTS OF A WORK THAT WILL COVER THE ENTIRE CHAIN OF LAKES. THEY CONTAIN CHARTS OF LEADING CHANNELS AND HARBORS, AND MAY BE HAD FROM THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, AT \$1 EACH.

Around the Lakes.

Stockholders of the Metropolitan Land & Iron Co., controlling the Norrie mine, will receive a dividend of \$1.25 a share on Aug. 1.

Harbor tugs at Racine are competing for business. The tug Wau Bun, owned by the Racine Dredge Co., has been towing at very low rates.

Roy Marquette, mate of the steamer Frank L. Vance and brother of Capt. E. B. Marquette of the same boat, was killed by being crushed between railway cars at Ashtabula harbor Monday.

Capt. James Davidson of West Bay City, Mich., is now quoted as saying that he will not put in this year machinery for building steel boats, but will continue the construction of wooden vessels.

Capt. C. S. Furey, now in the steamer Shenandoah, will bring out the new Davidson steamer Sacramento. He will be succeeded in the Shenandoah by Capt. Frank Welcome, who was up to a short time ago with the Northern Steamship Co.

Shipments of ore from Ashland for the season to July 14 aggregated 1,028,091 gross tons, of which 540,151 tons was moved over the docks of the Chicago & Northwestern Railway Co. and 487,940 tons over the docks of the Wisconsin Central.

About once a week a new story is told of a transpacific line to be controlled by President J. J. Hill of the Great Northern Railway. Now it is said that he will buy for this service five steamers that were built on the Clyde to be operated under the Chinese flag.

The Davidson steamer Rappahannock, on which Henry Penton of the Frontier Iron Works, Detroit, and students of the class of mechanical engineering from the Michigan Agricultural College are now conducting a test of machinery, is fitted with Howden hot draft apparatus.

Information is wanted by the friends of John Dixon Chadwick, formerly watchman on the schooner Wadena and up to last June wheelsman on some lake steamer. Since June nothing has been heard from him. His people are anxious to learn of his whereabouts, and any information addressed to the MARINE REVIEW, Cleveland, will be greatly appreciated.

Following are new lake vessels registered in the office of the bureau of navigation, treasury department, during the past week: Steam—Sacramento, Port Huron, Mich., 2,380.88 tons gross, 1,903.33 net, No. 116,682; Elsa, Sandusky, O., 33.73 tons gross, 27.97 net, No. 136,511; Buckeye Belle, Toledo, O., 10.34 tons gross, 7.04 net, No. 3,655. Sail—Trix, Chicago, Ill., 6.76 tons gross, same net, No. 145,696.

The Canadian passenger steamer Cibola, which was burned at Lewiston, Niagara river, several days ago, was a steel boat of considerable value and high speed. She was 250 feet long and of 2,800 horse power. Her engines were built in Scotland and were of the direct acting, diagonal, compound type with cylinders of 17 and 85 inches diameter. She had six boilers, and it is claimed that she at one time attained a speed of 22 miles an hour.

The Bertram Engine Works, Toronto, has just launched a yacht for the Royal Canadian Yacht Club. This is the concern with which Messrs. Angstrom and Curr, formerly employed by the Cleveland Ship Building Co., are associated. The boat is 65 feet over all, 13 feet beam and 4 feet hold. She has compound engines with cylinders 7 and 14 by 9 inches. The hull is steel throughout, and the boat is flush decked, with a wooden awning roof aft, cabin amidships, and pilot house forward, all joined as one. This arrangement is considered very neat and advantageous.

In accordance with the policy of certain managers of the Buffalo line boats, Capt. Byrne and the entire crew of the Union line steamer Owego were discharged, a few days ago, as a result of the boat striking on Racine reef, Lake Michigan. This unwritten law in two or three of the Buffalo lines, which calls for a captain's resignation immediately following an accident, may be unjust in some cases, but it has been the means of causing masters of line boats to be exceedingly careful. Since the discharge of Capt. Byrne there has been considerable discussion in Cleveland as to the merits or injustice of the Buffalo policy.

Engines and Blowers for Steamships.

The Huyett & Smith Mfg. Co., one of the leading industrial concerns of Detroit, is engaging quite extensively in the business of furnishing fan blowers and direct-attached engines as draft appliances for steamships. They are now constructing the necessary blowers and engines for the Cleveland & Buffalo Transit Co's big side-wheel steamer, to be built by the Detroit Dry Dock Co., and they will furnish similar appliances for two steamers building at Roach's ship yard, Chester, Pa., for service between New York and New London. Engines of special design are being built for these blowers and it is the intention to illustrate and describe them in a later issue of the REVIEW.

The Nickel Plate road has compiled a list of country homes along the south shore of Lake Erie, willing to accommodate summer boarders, and a copy will be mailed to any address by enclosing a stamp to any agent of the Nickel Plate road, or to B. F. Horner, general passenger agent. Aug. 31—265

Danger of Long Tows.

It is not the intention of the REVIEW to assist in any way the efforts of manufacturers of patent machinery to force upon vessel owners the sale of such machinery. Attempts are often made to have the supervising inspectors of steam vessels and other government officials endorse patent devices, many of them worthless, and thus force their sale through legislation of one kind and another. This has not been the case with the steam towing machine which has been adopted by the Minnesota Steamship Co., and other vessel owners, but it would seem that the merits of this device for lake service is becoming more evident every day.

Take for instance the accident which occurred in the St. Clair canal a few days ago, and through which three of the crew of the tug Torrent lost their lives. If it had been practicable to shorten the long tow line between the steamer Sitka and her consort, the Yukon, which caused the accident, it is quite probable that this loss of life might have been avoided. But loss of time and other annoyances attend the shortening of tow lines under the ordinary method of towing and it is not done. The masters of the Sitka and Yukon followed the regular practice and were not to blame, but if all tows were provided with these machines, which take in and pay out the line from a drum while the vessels are in motion, and with no difficulty whatever, there would be less danger of accidents of this kind. The movement of tows through narrow and crooked channels would not only be simplified and made easy to the tows themselves, but the danger of grounding, or collision with passing vessels, would be greatly reduced.

Remarkable Results from Use of Hot Draft.

Following is a report of the performance of three steamers of the Goodrich line, Chicago, which were fitted with the Howden system of hot draft for service in 1894. Figures for 1893 show results with Pittsburgh coal before Howden hot draft was fitted, while those for 1894 represent results with Indiana coal, a much poorer grade of fuel, after Howden hot draft was fitted:

	MILES RUN.	TONS OF COAL USED.	COST.	POUNDS OF COAL PER MILE.	SAVING PER CENT.	COST PER MILE RUN.	SAVING PER CENT.
STR. INDIANA.							
SEASON							
1893	24,870	2,795	\$9,191 90	224.7		.37	
1894	24,500	2,633	5,641 57	214.9	5	.23	38
STR. RACINE.							
1893	23,660	2,350	8,759 71	198.7		.38	
1894	22,770	2,000	3,987 50	175.7	12	.18	50
STR. ATLANTA.							
1893	23,615	2,791	8,903 40	238		.38	
1894	22,680	2,320	4,838 44	205	15	.22	40

Drain Upon Supplies of the Best Lake Ores.

It is quite generally admitted that a material advance in the price of Bessemer ores from the Lake Superior region next year is a certainty. The causes leading to this conclusion are discussed intelligently in an extended article in the last issue of the Iron Trade Review, in which reliable statistics on the subject are presented. The Review says:

"A study of the statistics for 1894 shows that fully 85 per cent. of the Bessemer pig iron of the year was made from Lake Superior ores. Applying the same proportion, as may be fairly done, to the output for this year, and assuming that the second half of 1895 will only yield as much Bessemer pig as the first half, the total consumption of lake Bessemers in 1895 would be above 6,500,000 tons. For 1896 our reckoning must be expanded to the extent of an added 1,000 tons of Bessemer pig a day at Duquesne and a like amount from the furnaces to be built at Lorain. If the years 1894, 1895 and 1896 shall prove to have made a total drain upon the Bessemer ore supplies of Lake Superior of 20,000,000 tons, it need not be said that old range producers of these ores are in sight of the point of exhaustion. We need not go now into the question of the Mesabi supply. Taking the lowest estimates of the proportion of these ores that are Bessemer, there is no doubt that as far as quantity goes this range could support the demand of the Bessemer steel producers of the country for some years to come. But we do not find that there is any perceptible increase in the percentage of these ores used in Bessemer mixtures in the past twelve months. In some quarters the tendency is the other way. Furnacemen have shown their willingness to pay the price asked for old range Bessemers, and this year, at least, the demand for them has been greater than the supply.

"These considerations will, we doubt not, stimulate development work on all the old ranges. That there are deposits on these ranges that have not yet been put under tribute to the Bessemer steel industry there is little question, but their extent is at this stage an unknown quantity. The point to which statistics bring us is that a material advance in standard Bessemer ores is practically a certainty for 1896, and in the benefits of such an advance mine owner and mine laborer, vessel owner and vessel laborer are bound to share."

Improve the Old River Bed.

Editor MARINE REVIEW: The subject of Cleveland harbor improvement justly attracts wide attention. Not only will the tax-payers have to foot the bills, but every man, woman or child will reap a share of the benefit. Greater Cleveland's grand opportunity is upon us, and the situation needs to be firmly grasped or it will slip by. At this point, it seems to me, there is danger of turning our energies in the wrong direction. For convenience, our joint committees has divided the whole harbor into sections, which is all proper enough, but they have made their first section to embrace that portion lying between East and West River streets, and purpose putting the first work and expenditure upon this. Many think this very unwise; in fact disastrous to the very cause of harbor improvement. The opinion of a most competent and certainly disinterested judge, Col. Jared Smith, the distinguished United States engineer, is herein entitled to great weight.

No doubt the side-wheel passenger boats will be glad to have a still wider basin in which to lie and turn, but it would seem that the Main street bridge improvements of last year are about as much as these people ought to expect the taxpayers to do for their especial benefit. No doubt they will take all they can get, but ought we to give it to them? The passenger business will not be augmented by the widening of the river between St. Clair and Front streets, but rather the reverse, since as Col. Smith has well pointed out, the enlargement of the river will tend to make the stream still more repulsive.

But the handling of heavy freights, such as ore and coal, does cry out for immediate and drastic reform. The most reliable statistics indicate that more than 1,500,000 gross tons of ore were landed at the docks bordering the old river bed alone during the last season of navigation. A vastly greater quantity will naturally come here this year. It is quite a sight to see a train of thirty cars crossing Euclid or Willson avenue filled with ore and drawn by powerful locomotives on their way to the furnaces. Yet it would require no less than 4,200 of such immense trains to carry away the tonnage that came silently into the old river bed alone in 1894. Fancy the tonnage of coal in the contrary direction!

This vast amount of freight is gradually being carried in larger and larger vessels. As fast as old tonnage goes out of sight it is being replaced by leviathan steamers and barges. The limit of 380 feet, which is the longest that the present channel will accommodate, is already surpassed, and we are practically saying to the lake carriers "not at home." It is now or never with us as a city, if we wish to take care of our own legitimate business, or else we will have the unspeakable mortification of seeing it step into other channels, once for all.

Therefore, and to conclude, let the Detroit line wait with what we have given them until we take care of our own folks. Make your section No. 1 to include the Willow street bridge and its neighboring turns; spend a reasonable amount, perhaps no more than you have now in sight, in making an entrance for these large freight carriers, and do not spend your time and our money on a present improvement of doubtful value, which can wait, and which if pressed now will entail vast sums of money and years of litigation. Open the old river bed now, and let the river await its turn.

TAX-PAYER AND VESSEL OWNER.

Cleveland, July 24, 1894.

Passing Signals.

Mr. H. E. Schmuck of Springfield, Mass., is among a few eastern people who are financially interested in lake vessels. Mr. Schmuck is one of the stockholders in the company owning the steel steamer Centurion, and takes a great deal of interest in all matters pertaining to the lakes.

"I have just returned," he says to the REVIEW in a letter of recent date, "from my annual trip around the lakes on the Centurion, and I took particular pains to watch very closely and find a boat that failed to answer passing signals, as the men on our boat always insist upon an answer. I had some curiosity after the letter you published last fall from the gentlemen in Bay City on this subject, and I determined to report any case that came under my observation. I did not have a case with our own boat, but on July 13, about 12:30 or 1 p. m., as I recollect, we were coming in at Port Huron, opposite the Grand Trunk shops. We saw one of the Lake Superior Iron Co.'s boats coming out and blew her one whistle, receiving no response. We blew her one whistle again, but got no answer. Finally we blew her a third time with a vengeance, and we managed to get an answer. The captain was not on the bridge but his mate was in charge. I saw a case, about an hour later, of two other vessels where no signal was given, but as our boat had nothing to do with it I said nothing."

CAPTAINS AND MATES ARE INVITED TO CALL AT THE OFFICE OF THE MARINE REVIEW, AND LOOK OVER THE SAILING DIRECTIONS OF LAKES SUPERIOR, HURON AND MICHIGAN, PUBLISHED BY THE HYDROGRAPHIC OFFICE.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
Year ending June 30, 1890.....	218	108,515.00
" " " 1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
Total.....	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

ALL CALCULATIONS regarding lake freights during the closing months of the season are dependent upon the crop situation. This applies to business generally throughout the country, but it is especially true of the lake trade, as a heavy movement of grain from the northwest is certain to cause high freights. The time is approaching fast when this matter of crops will be settled. If present favorable indications are realized, lake vessels will not only have plenty of grain to carry, but many railroads will be able to borrow or make enough money to take care of renewals and betterments. These railroad orders are expected to maintain the present demand for iron, and may cause a rush which would drive values materially higher.

JOHN BIRKINBINE, iron expert and statistician, refers to the waste of non-Bessemer ores on the Mesaba as butchery. He says these ores will be needed in the future and they should not be wasted so utterly as to do away with the possibility of recovering them when they are wanted. There are a great many men in the iron business who agree with Mr. Birkinbine that ores now graded within the Bessemer limit are getting scarce, but the supply of non-Bessemer is so abundant that his idea of the future is of little encouragement to those who have large sums of money invested in mining properties and are unable to work them at a profit even for the Bessemer ore that is to be had from them.

It is more than probable that immediately following the completion of the new lock at Sault Ste. Marie a demand will be made for an increase in the width of the new Hay Lake channel. Accidents seem at times unavoidable at some of the turns in the channel, even with the present volume of traffic. This channel is a wonderful improvement over the old route to and from Lake Superior, but like a great many other big works of its kind, it was not, in some parts, planned to fully meet the immense increase in Lake Superior traffic that has occurred within a few years.

WITHOUT ANY reference to the efforts of the vessel owners to regulate raft towing throughout the lakes, Major Sears, government engineer at Duluth, specially recommends, in his annual report, the passage of legislation regulating rafting within the bay forming the harbors of Duluth

and Superior. What is necessary in St. Louis bay is, of course, even more necessary in the narrow connecting waters of the lakes. This recommendation from Major Sears serves to indicate what may be expected from honest and unbiased opinion in the rafting matter.

A PAMPHLET of twenty-six pages, just issued by the board of trustees of the Chicago drainage canal, gives the board's side of the question of lake level effects on account of the canal. The canal engineers make an important point in declaring at the outset that comprehensive measurements of the outflow of the several lakes under all conditions and extended through a term of years are evidently very desirable for many public reasons.

THE REVIEW is not in the habit of recommending everything in the way of a marine publication that is offered for sale to owners and officers of ships. We have no hesitancy in saying, however, that the charts of the different lakes now being gotten out by the hydrographic office are appreciated by all masters who have seen them. The publication of these charts is the most practical work as yet undertaken by the hydrographic service.

PRESIDENT LIVINGSTONE and other officers of the Lake Carriers' Association are anxious that the 600,000-ton mark shall be reached in the vessel membership of the association before the next annual meeting, and they are straining every effort with that aim in view. It is true that a great many vessel owners are benefited by the efforts of the association but contribute nothing towards its support.

In General.

Germany has a total of 7,366 miles of canal.

Another German canal is now talked of, viz., one to connect the lower Elbe and lower Weser just above Bremen.

Evidence in support of the claim that the water tube boiler is not new is increasing. It is now claimed that a boiler of this type 1,800 years old has been discovered at Pompeii.

E. V. Smalley, editor of the North-West Magazine, St. Paul, has written for the August number of the Forum an article on the "West's Need of a Deep Waterway from the Great Lakes to the Atlantic."

Ramie silk, of which the spinnaker of the new yacht Defender has been made, is 25 per cent stronger than duck when dry and when wet 50 per cent. stronger. Only the Chinese understand the art of weaving it rightly, and as a consequence it is costly.

Of course there is nothing definite as yet regarding the report of the Nicaragua canal commission, recently returned to this country, but they are said to be of the opinion that the work can be completed in six or seven years within a limit of \$110,000,000.

The composite light vessel intended for service in Boston harbor, and for which the light-house board called for bids recently, will be constructed by the Bath Iron Works of Bath, Me. In the present condition of business on the lakes, builders here were not anxious to secure this job, although the boat might have been taken to the coast without difficulty.

New orders for merchant vessels on the Atlantic coast are quite numerous. The order given the Cramps some time ago for a new steamer for the Red D line, operated by Messrs. Boulton, Bliss and Dallett of New York, (the boat was illustrated and described in the REVIEW of April 11, 1895) has been duplicated and now stands for two ships, alike in all respects, and both designed by John Haug of Philadelphia.

One of the ships of the White Star line, the Germanic, furnishes an illustration of the life of a set of first-class marine engines. This steamer left Belfast in the year 1875 to take her station on the line between Liverpool and New York, and from that time until she was returned to her builders at the end of last year to receive new triple expansion engines, boilers, etc., she was regularly at work on the Atlantic, and made no less than 211 round voyages, 422 passages across the Atlantic, running a distance of more than one and one-half million statute miles.

All the talk about the United States cruiser Columbia having been strained while in dock on the other side was based on a telegram from the captain of the ship, who reported that although he had furnished the docking company with a set of docking plans of the vessel, it was found when the water was pumped out that no bilge blocks had been laid and the bottom of the vessel was unsupported for some distance. Later cablegrams to the navy department were to the effect that the Columbia had sustained no injury whatever, but upon arrival in New York she will be placed in dock and surveyed, and if any damage is found a court of inquiry will probably be assembled to place the blame.

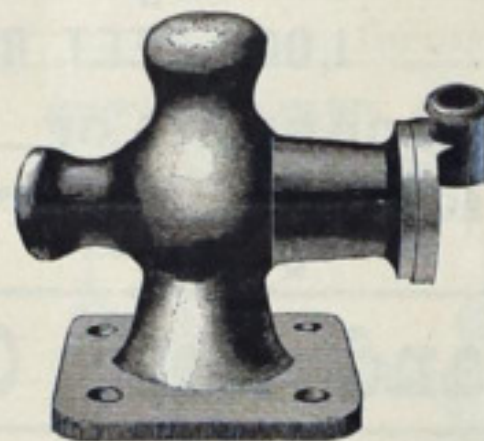
A CHART COVERING LAKE HURON, GEORGIAN BAY AND THE STRAITS OF MACKINAC, ALL ON ONE SHEET, HAS BEEN ISSUED BY THE HYDROGRAPHIC OFFICE AND MAY BE HAD FROM THE MARINE REVIEW AT 75 CENTS. LAKE SUPERIOR ON ONE SHEET IS ALSO IN PRINT AND SELLS AT THE SAME PRICE.

New Pocket Docks on Detroit River.

Improvements made in facilities for rapid fueling of steamers on the lakes, during the past few years, are quite wonderful. First the coal was wheeled aboard, and then docks were provided with McMyler derricks for hoisting fuel in buckets. Later on this equipment was placed aboard scows, which carried a large supply in buckets on deck, the fuel being loaded while vessels were unloading or taking on cargo. The greatest improvement, however, came with the introduction of the pocket dock, from which 100 tons of fuel may be shot into the bunkers in a few minutes. The first of these was the Smith dock on Detroit river. Other docks at Amherstburg and other places followed, and the latest of them is shown in the accompanying illustration. It was erected by James Graham, who is well known in the fueling business, and whose dock is at the foot of 21st street, Detroit. One thousand tons of fuel is kept on hand at all times and can be taken from chutes, high platform or docks, and as may be seen from the illustration, the pockets are of different heights, suitable for high or low decks. The dock is below routes of the car and passenger ferries, and the width of the river at this point is an advantage in rounding to with tows. If captains have business down town, they may, by electric cars, reach the City Hall in ten minutes. The steamer Bielman stopped and took on 40 tons at this dock last week and got away in six minutes. One of the advantages claimed is car weights. The dock is about eight blocks above the Clark dry docks and is next to the gas works, which is well known to captains.

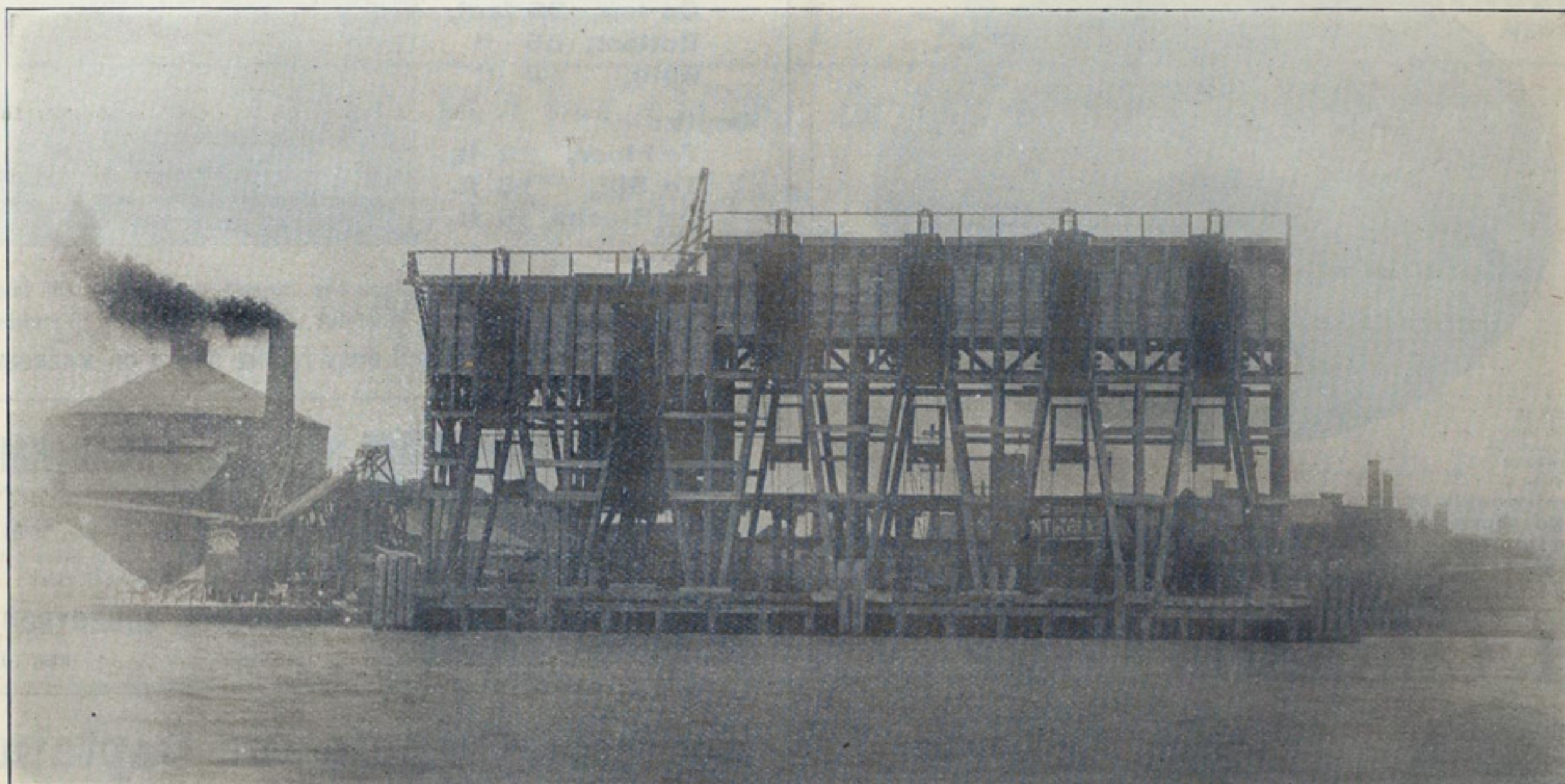
Combined Winch, Windlass and Bitt.

The illustration herewith shows an interesting labor-saving and convenient device that will come into general use where it is of advantage



on lake vessels. For handling sails on yachts and schooners it is hard to beat, as it holds the sheet while being hauled. One man can easily hold the turn in the heaviest weather and gather all the slack, and is sure of holding all he gets, and by luffing the vessel one man can haul the sheet aft in a gale of wind; or if it is not considered advisable to luff, then the heaver can be applied to assist in revolving the drum. It saves the cost of a wooden bitt, and besides the improvement, forms a combination winch

and windlass, occupying no more space than the wooden bitt. On account of the small amount of space occupied, it is preferable to a windlass, and it works rapidly. Barrels can be had smooth or capable of holding a chain. It is especially adapted for yachts, fishing vessels, schooners, tugs, and also on docks. The size for small yachts weighs only seventeen pounds and costs from \$9 to \$21, according to the material of which it is made. The largest weighs 280 pounds and will be found heavy enough for all purposes. It costs from \$30 upwards. The machines are carried



GRAHAM'S NEW POCKET DOCK, FOOT OF 21ST STREET, DETROIT.

Trade Notes.

The Gas Engine & Power Co., Morris Heights, New York, builders of small boats of all kinds, have taken up the sale of the West water tube boiler.

The Morrison suspension furnaces for steam boilers are rapidly working themselves into popular favor. The Continental Iron Works of Brooklyn, N. Y., the manufacturers, have recently furnished an equipment for the steamer Pennland of the Red Star line, and the American liner Paris is to be fitted out with them also.

Lieut. Meigs, U. S. N., who is representing the Bethlehem Iron Co. of South Bethlehem, Pa., in Russia, has cabled that company from St. Petersburg, saying that armor manufactured for the Russian government has undergone satisfactory test. Russia recently gave the company a contract for supplying armor for three new warships. The satisfactory test of the plate assures the acceptance of 1,200 tons of material.

Following is a paragraph contained in a letter from the Johnson Iron Works of New Orleans to H. G. Trout of Buffalo:

"The engineer of the steamer Wilson reports that the wheel now in use on the steamer, and which is of your make, gives satisfactory performance—as good results as the old wheel in fair weather and better against a head sea. It is easier on the engine than the old wheel. Speed claimed now with the new wheel 11 knots an hour. The captain of the Wilson corroborates the statement of the engineer."

in stock by the following lake agents: H. Chanon Co., Chicago; Upson-Walton Co., Cleveland; H. H. Baker & Co., Buffalo; M. I. Wilcox Cordage Supply Co., Toledo; H. D. Edwards & Co., Detroit, and H. Beckman & Son, Erie. This list of agents is a guarantee of the value of the device.

Reports of the final trial of the Olympia, received by the navy department, show that the vessel maintained a speed of nearly 20 knots in Sausalito channel for four hours on natural draught, which is greater than expected. The vessel was not forced in any way, accomplishing 20 knots with the greatest ease. She was heavily loaded, being 900 tons displacement greater than on her contractor's trial. The Olympia is now at San Francisco recruiting men for a three years' cruise. As soon as her complement is full she will go to Mare island navy yard for two weeks, and then proceed to China to replace the Baltimore as flagship.

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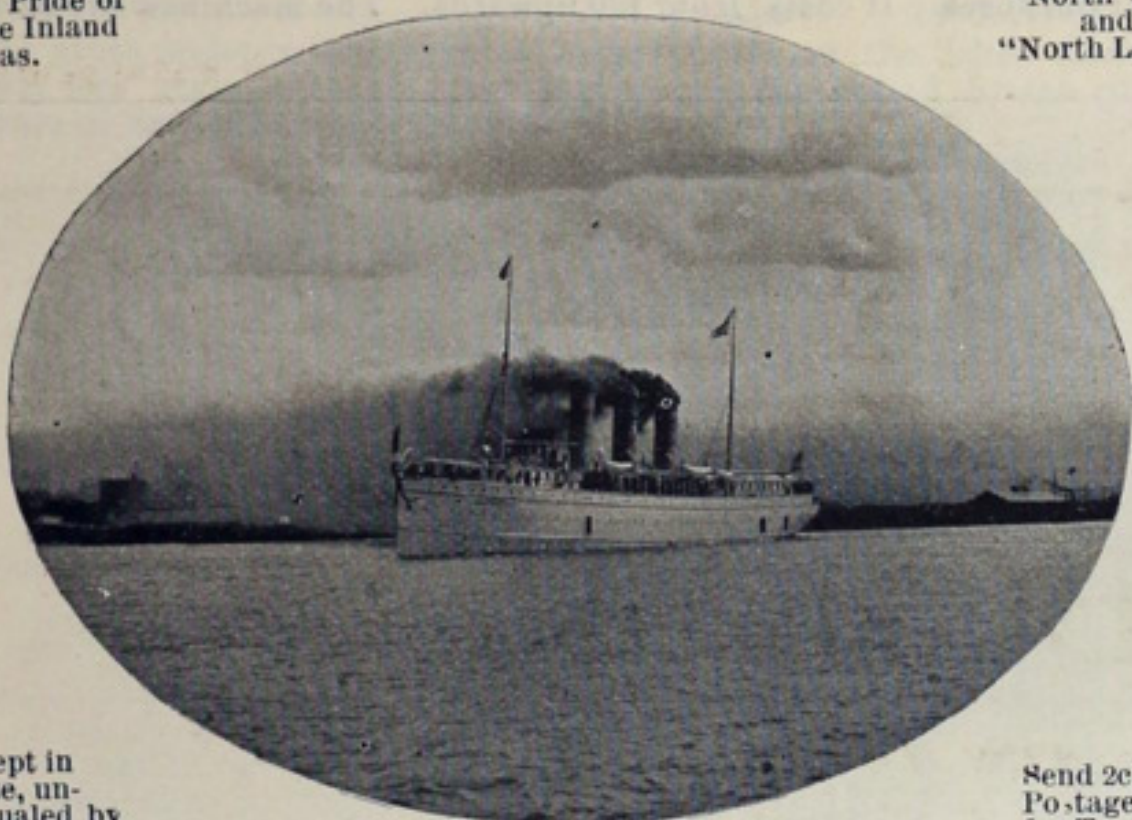
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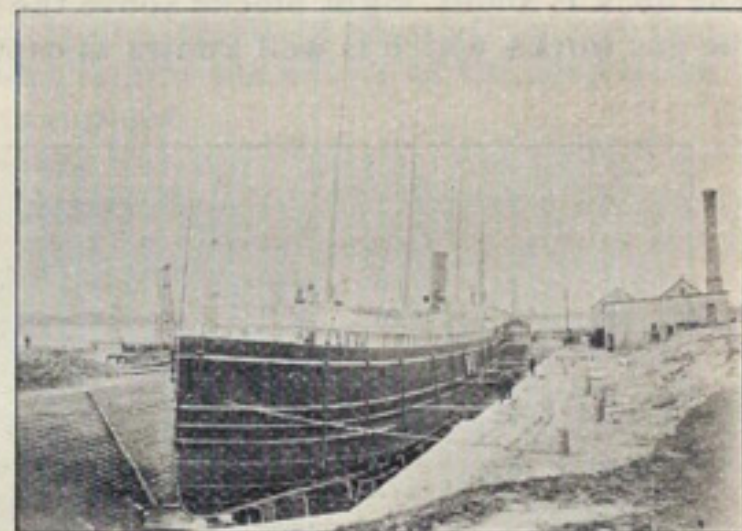
Gate, 62 "

Depth:

To Floor, 20 ft.

To Sill, 18 ft.

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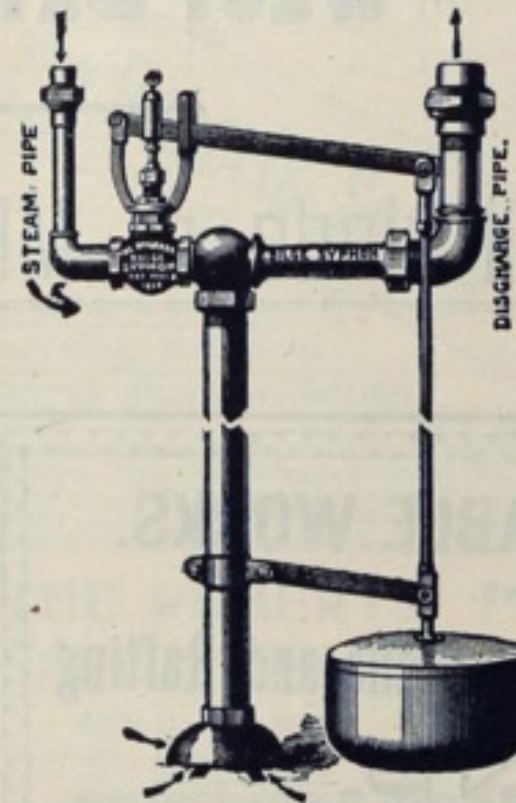
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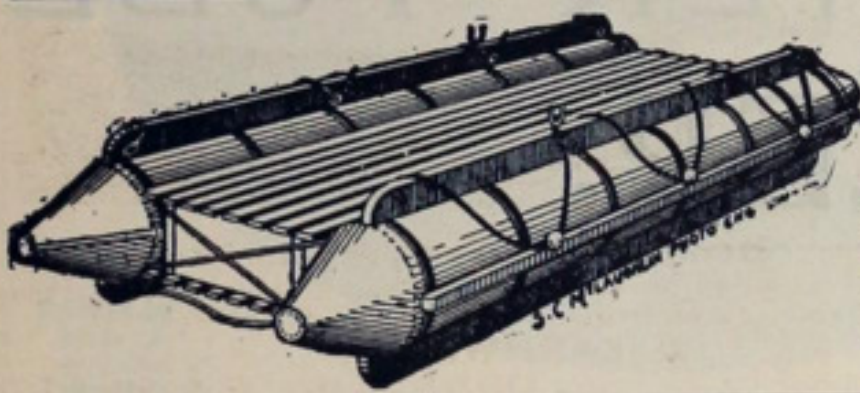
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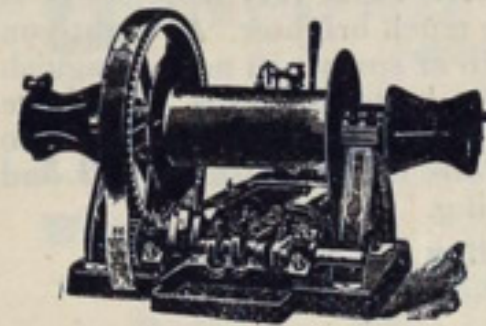


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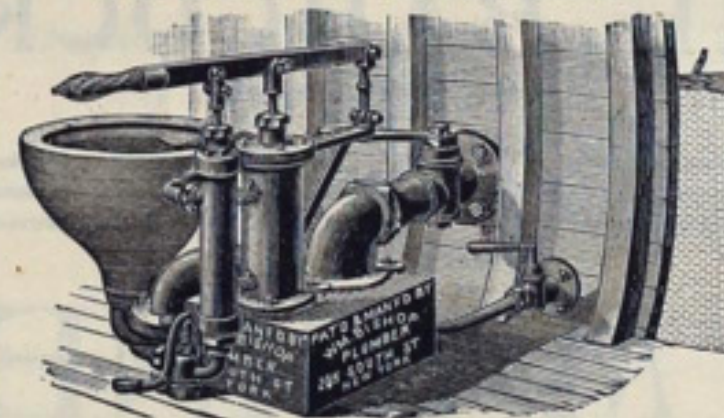
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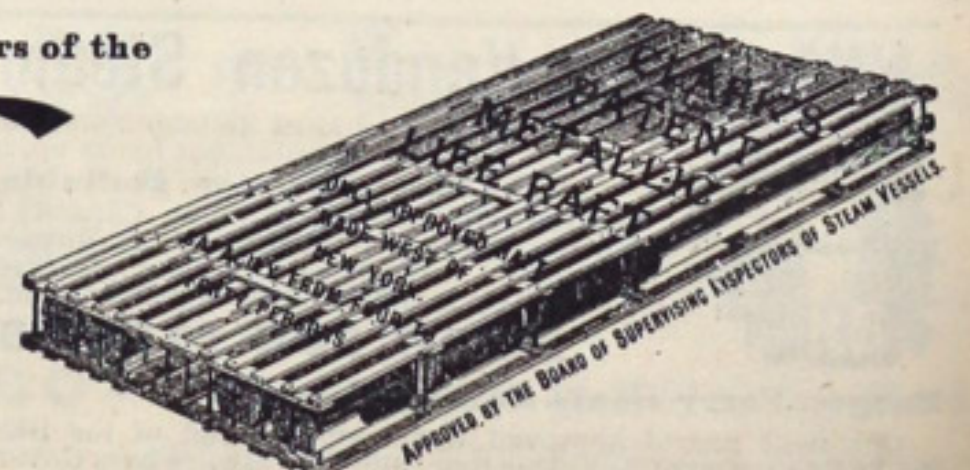
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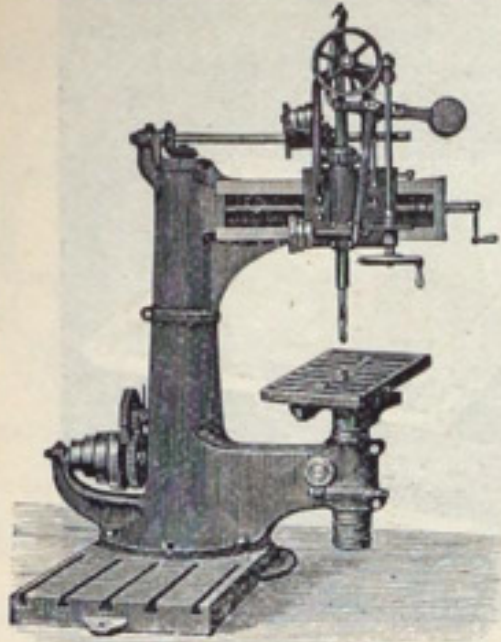
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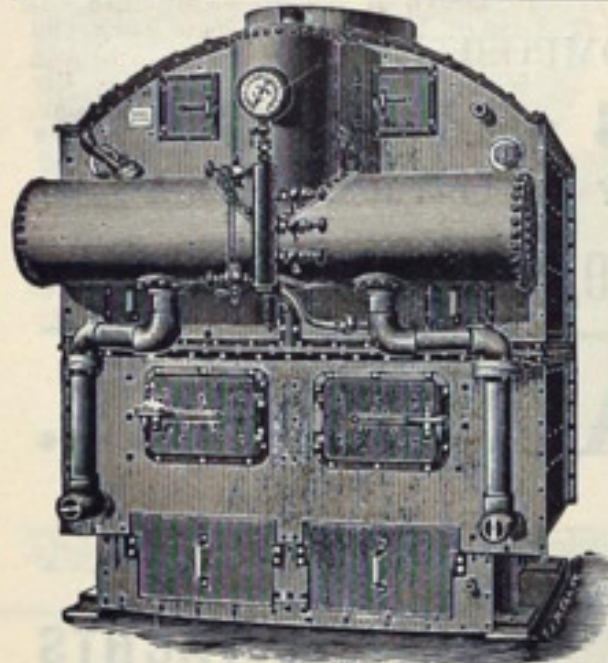
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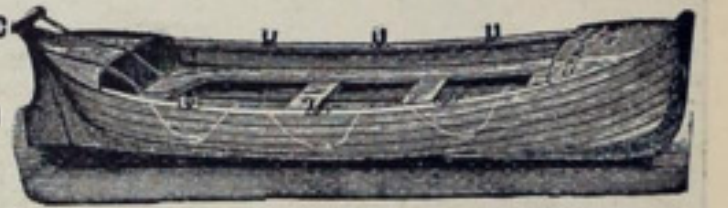
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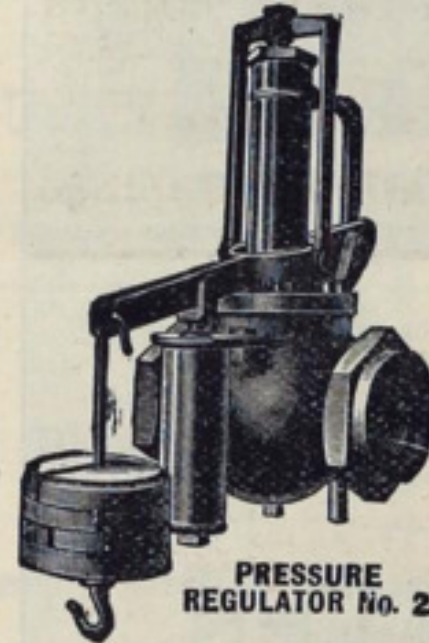


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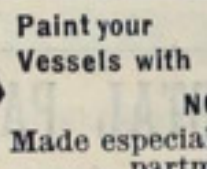
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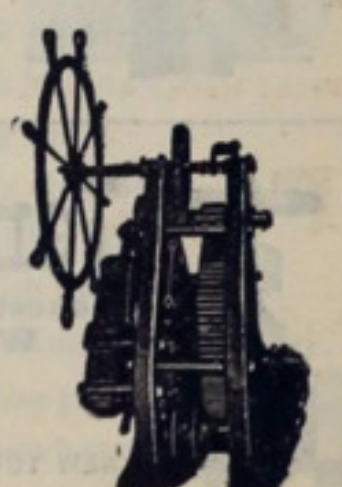
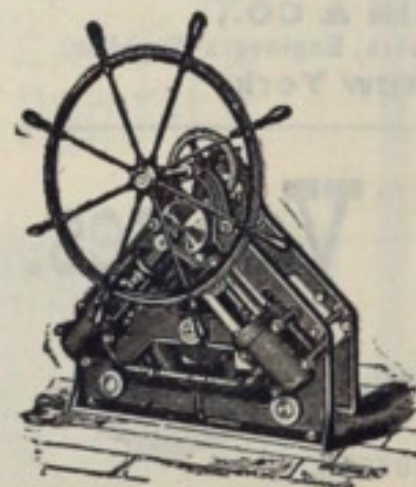
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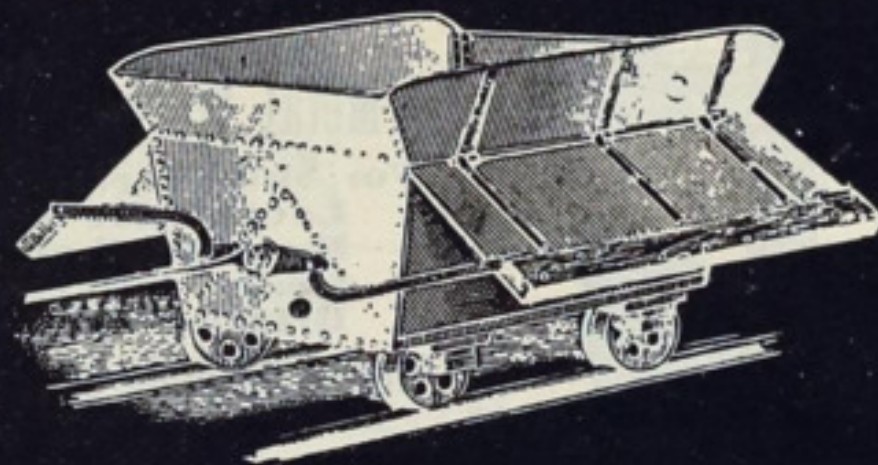
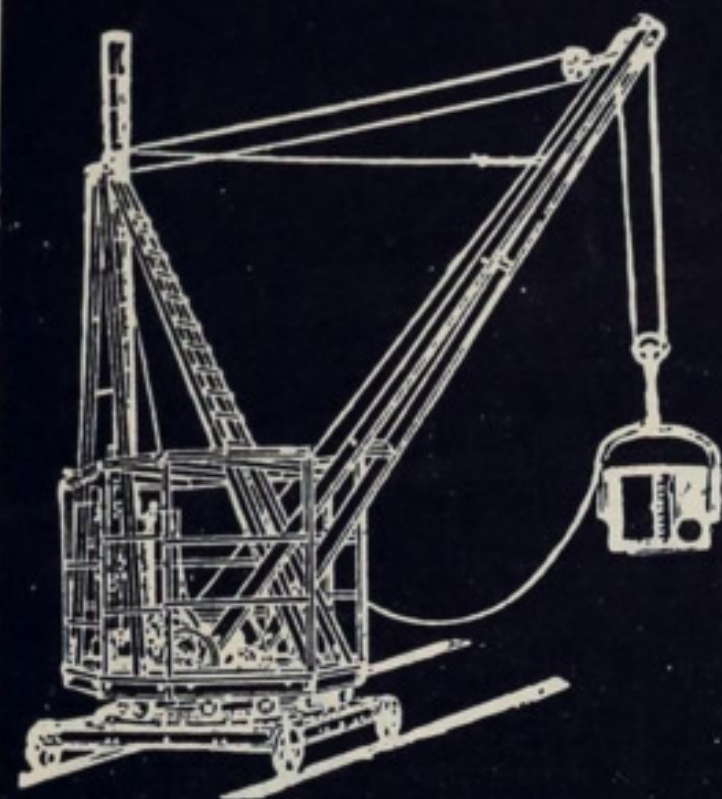
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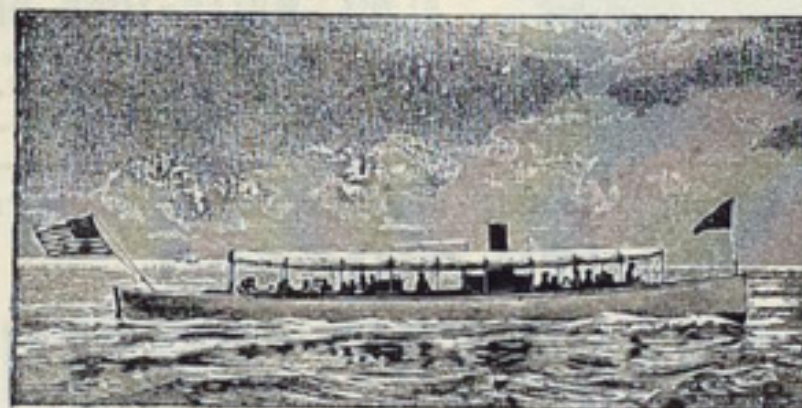
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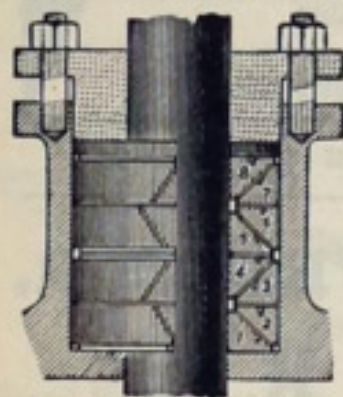
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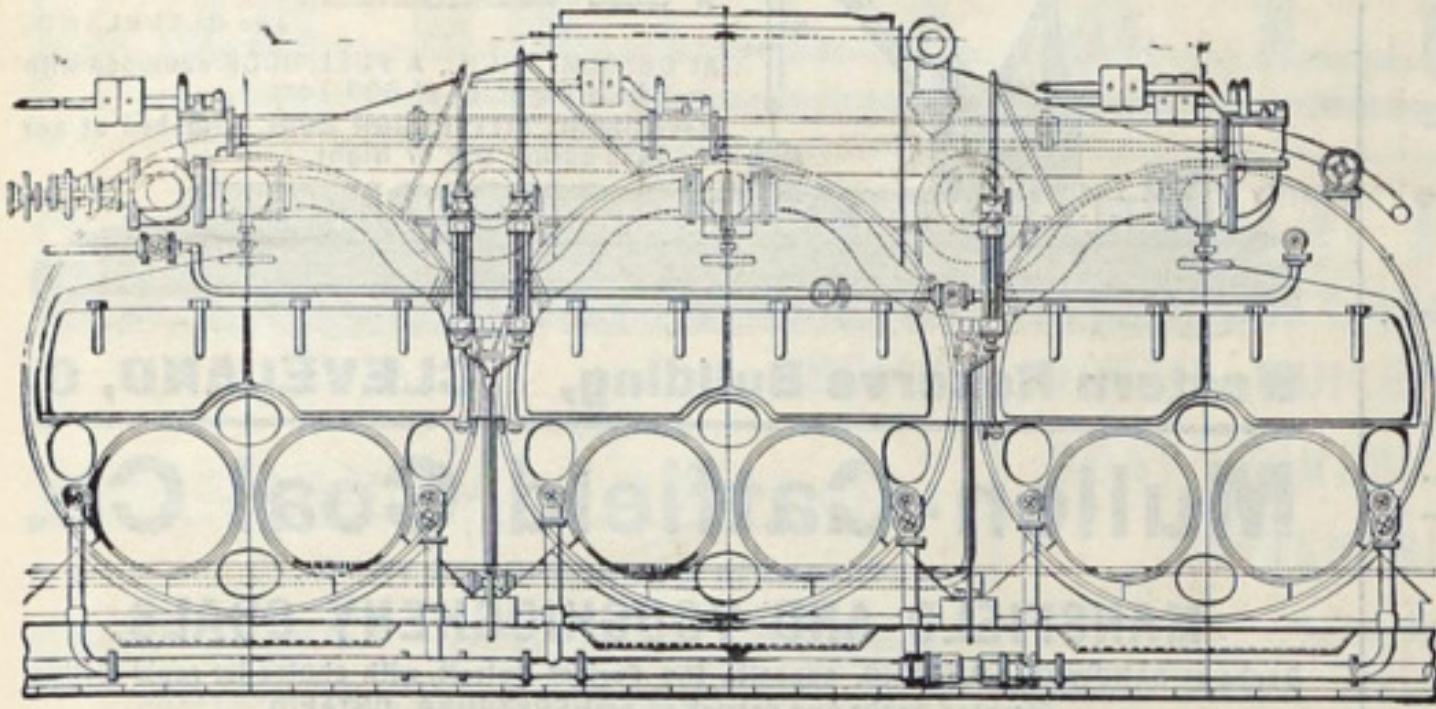
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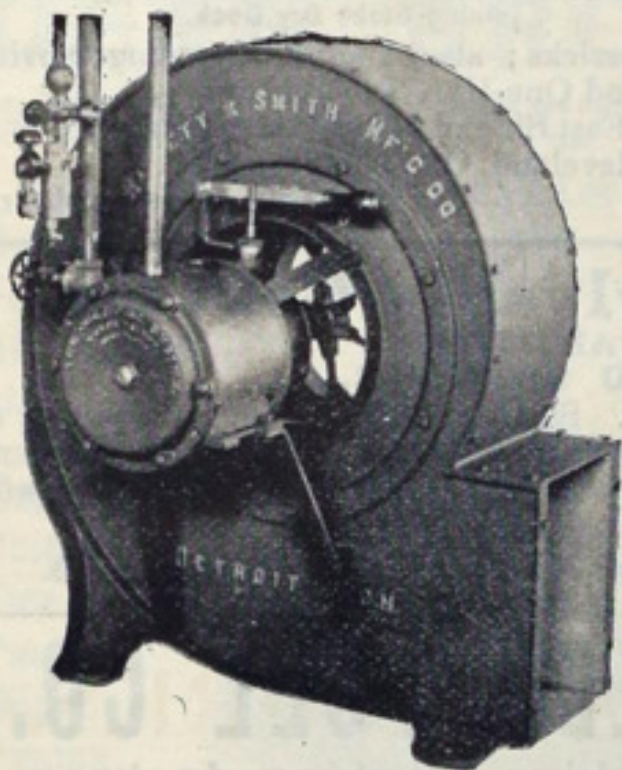
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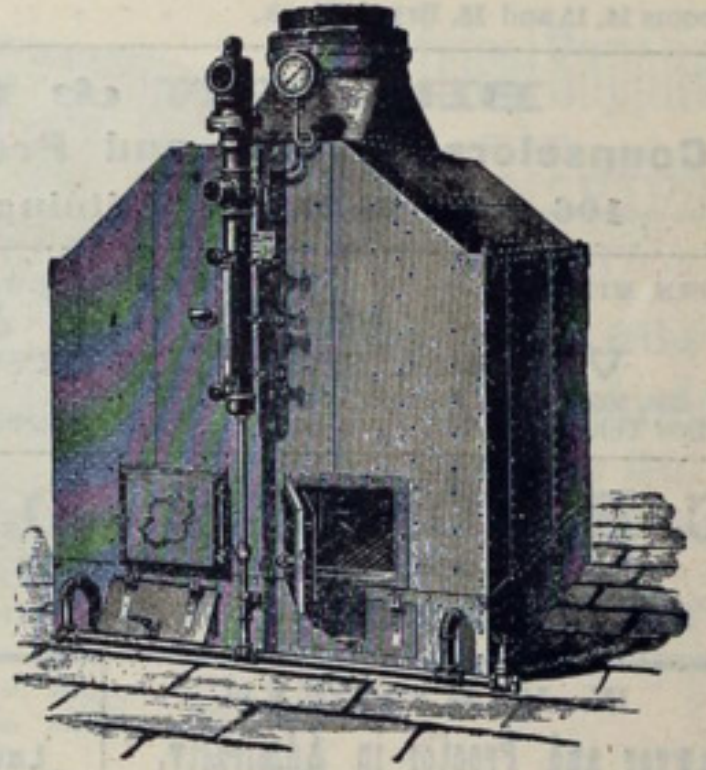
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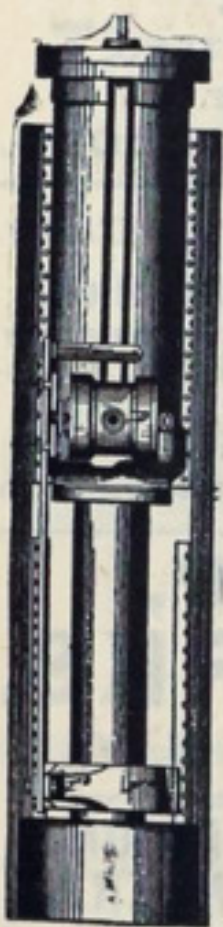
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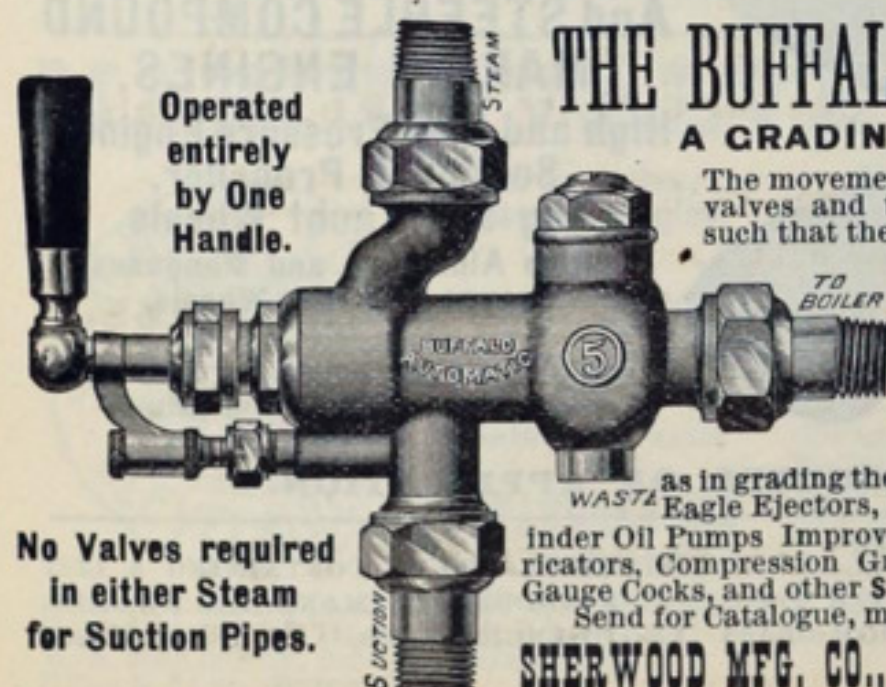
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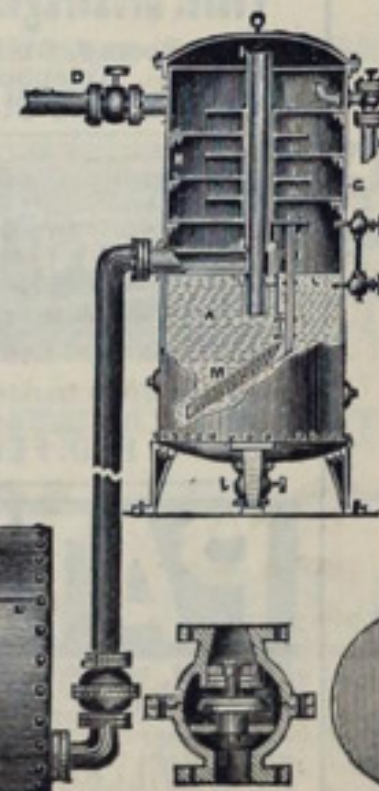
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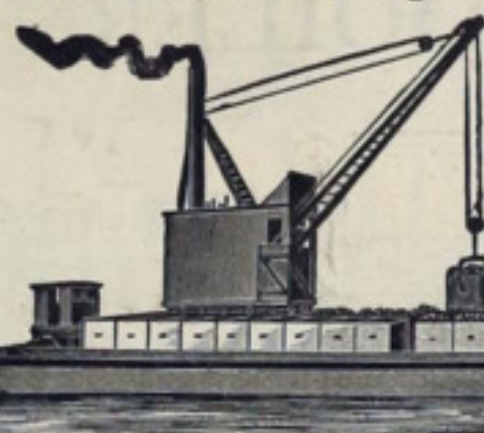
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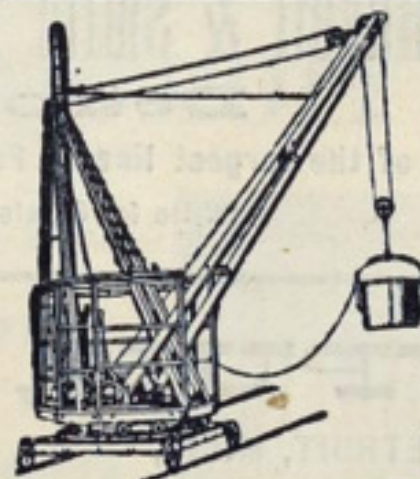
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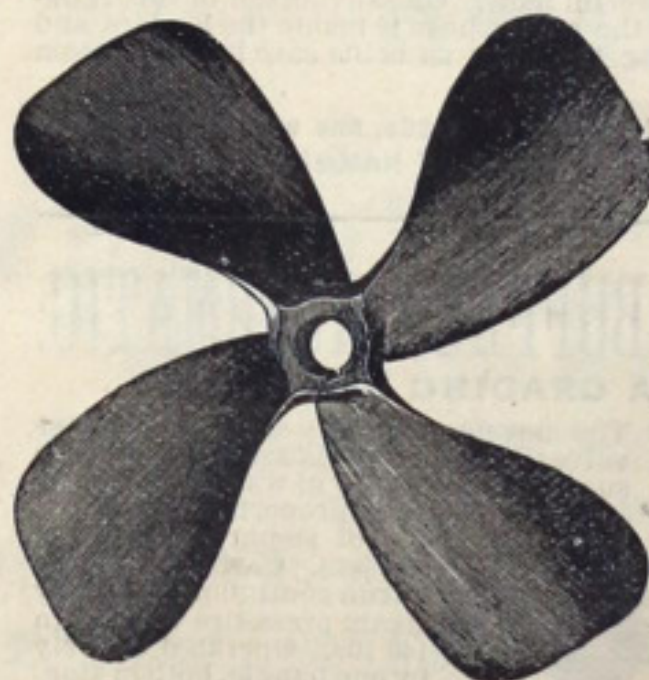
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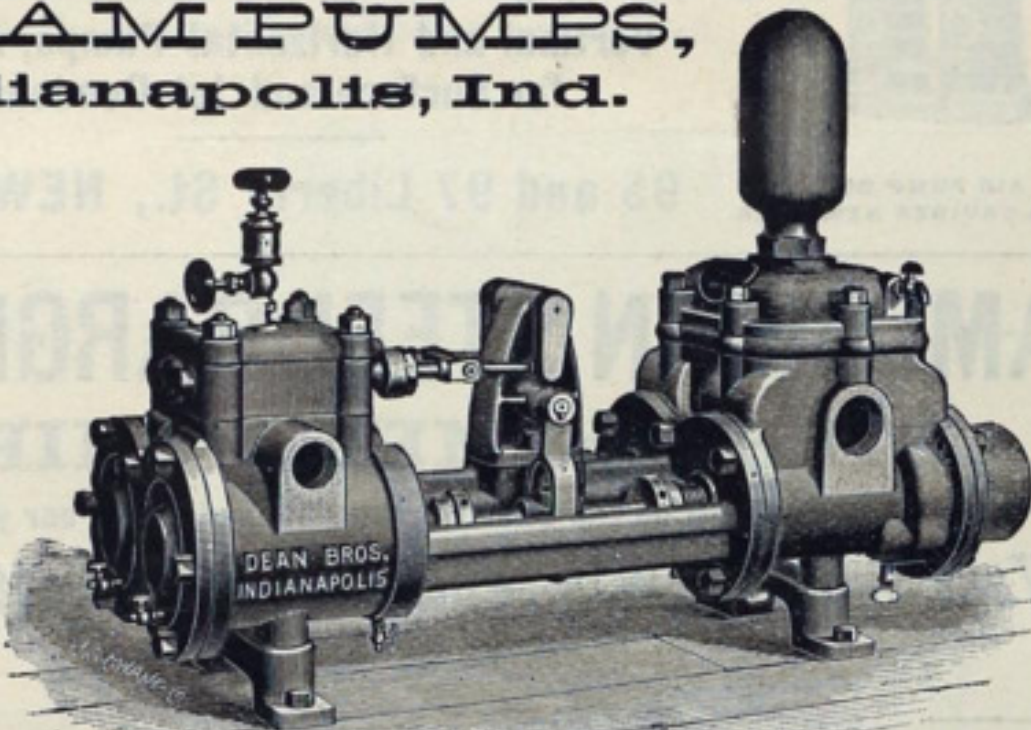
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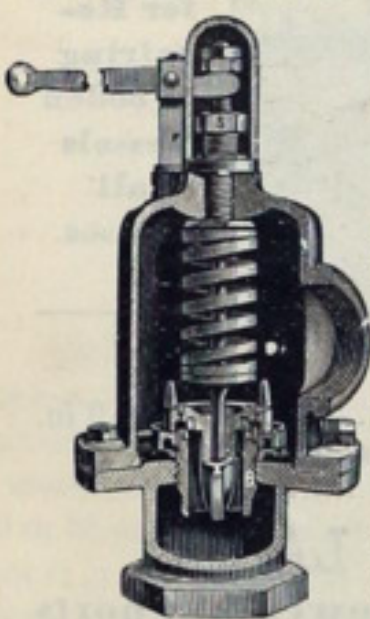


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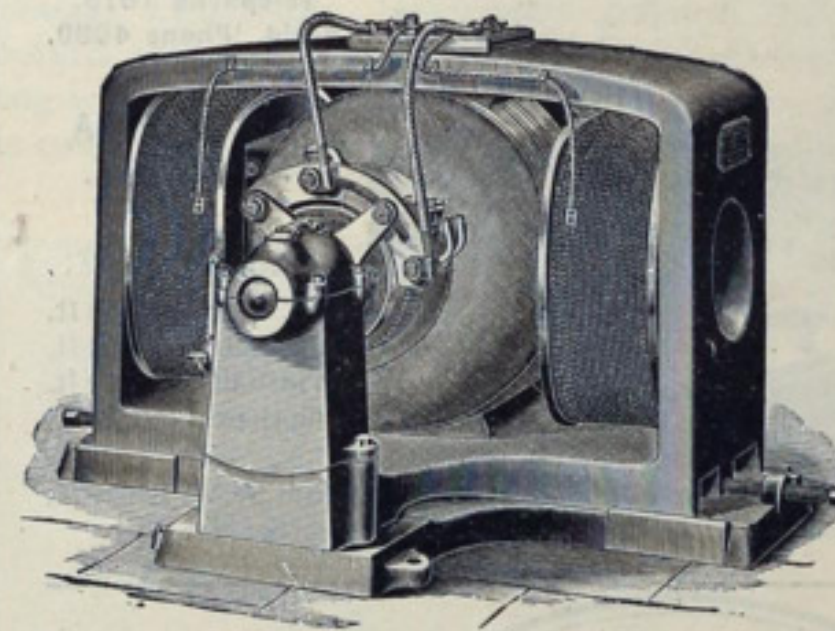
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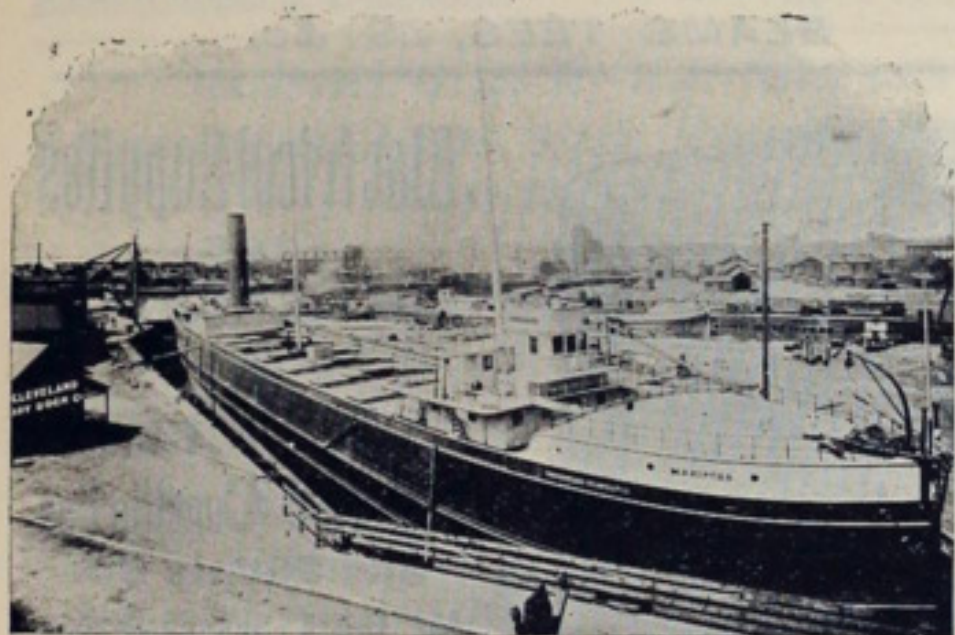
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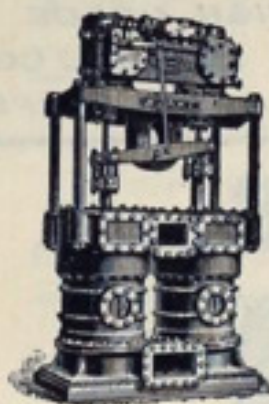
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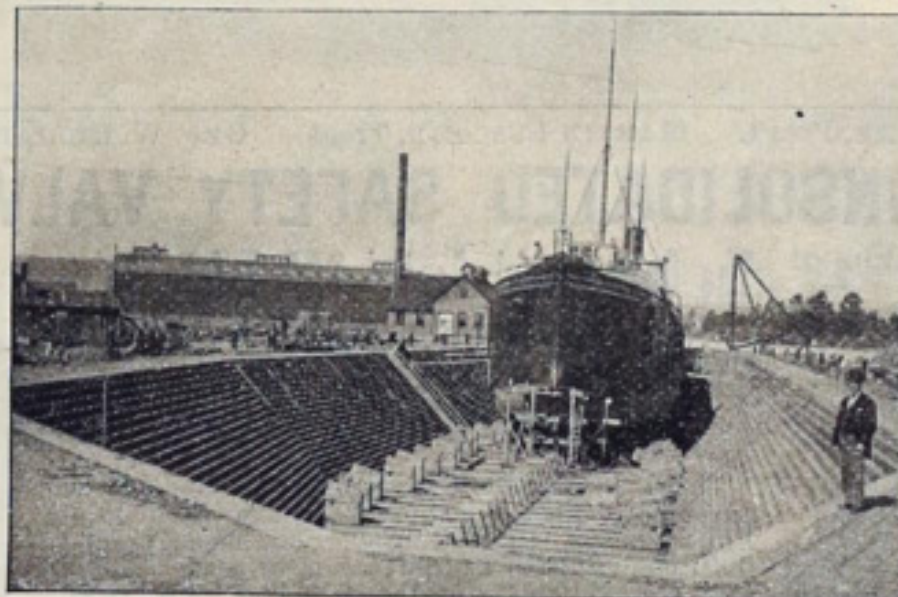
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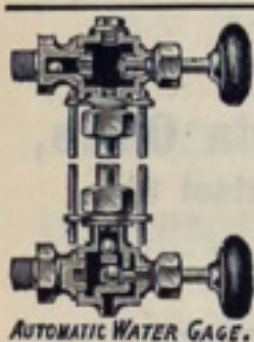
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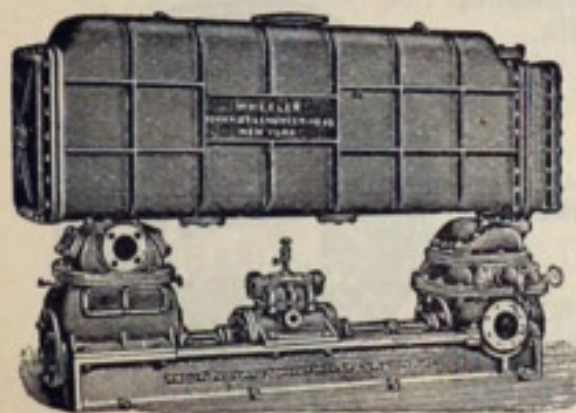
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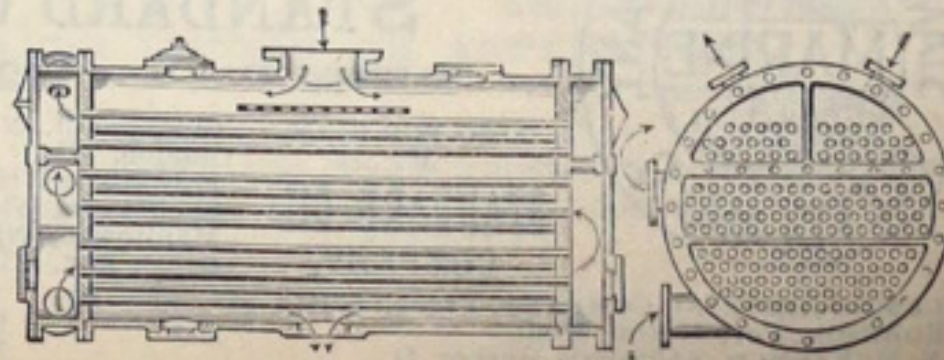
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